

Busting the Myth of Digital Twins and Planning Them Realistically

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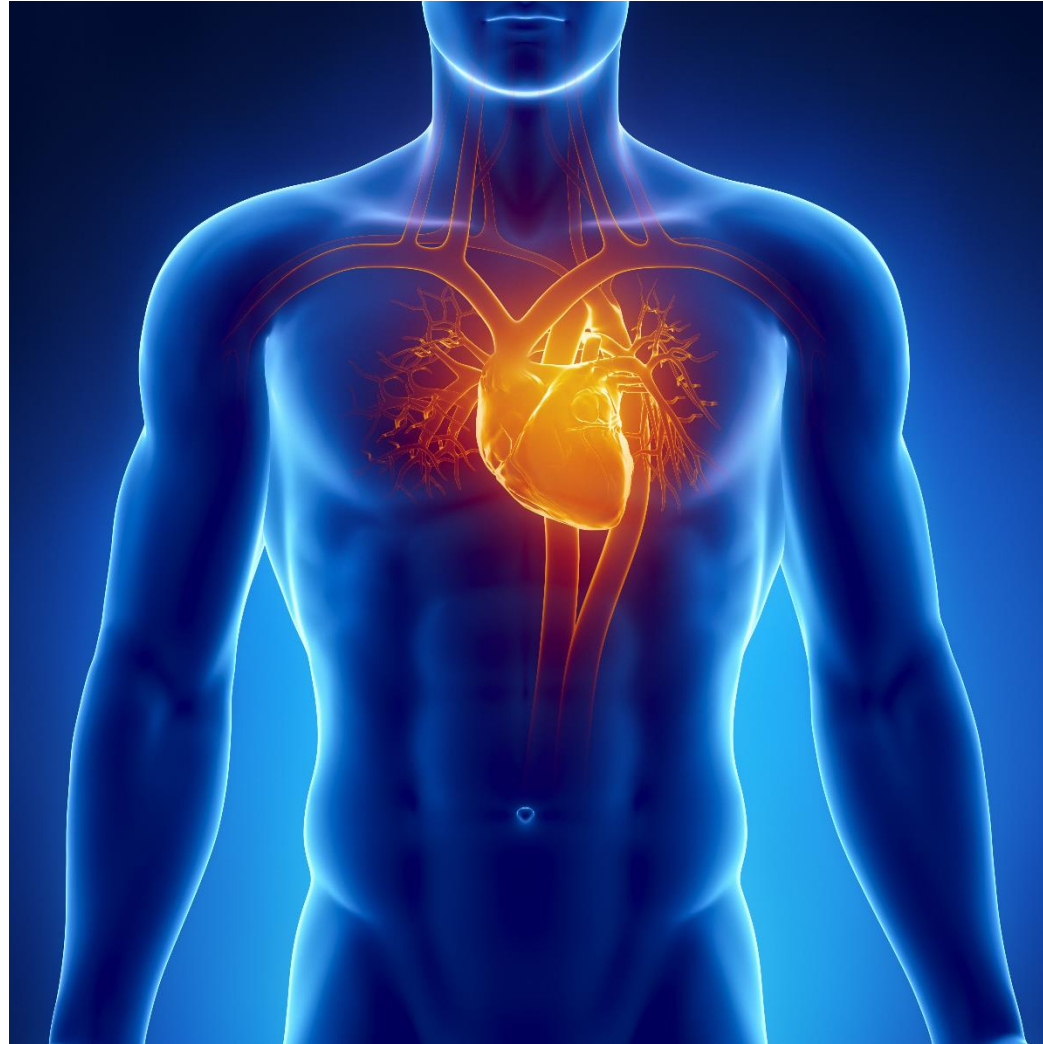
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A Personal Story



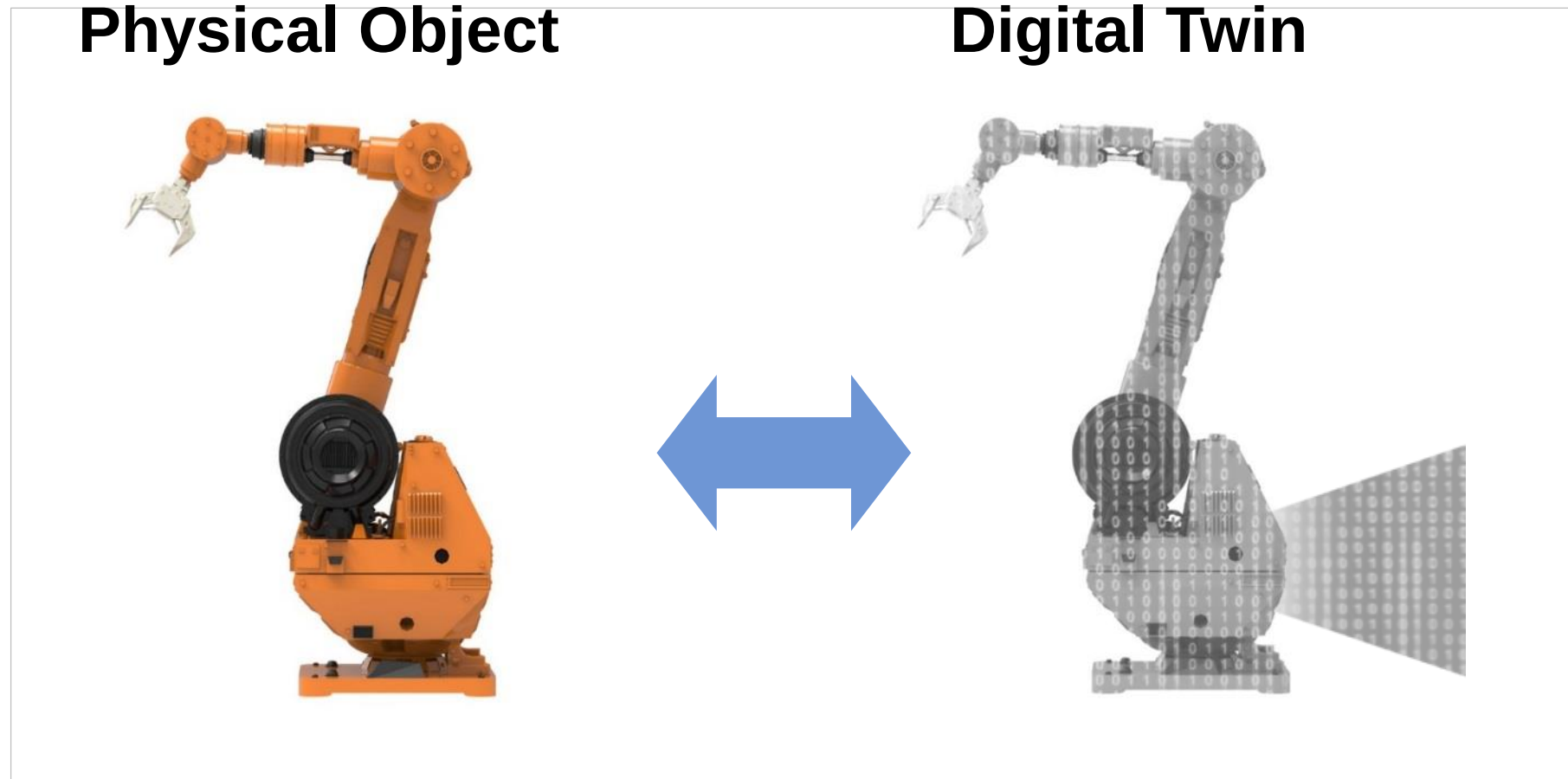
Key Topics

- What makes digital twins compelling?
- What are the priorities and risks of investing in a digital twins initiative?
- What are best practices to avoid digital twin failures?

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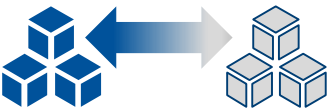
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What is a Digital Twin?



Digital Twins are More Than the Model

 **Model**
A model of the "thing"

 **Uniqueness**
Each physical thing has at least one unique twin

 **Data**
e.g., identity, status, context, ...

 **Simulation**
Simulate the real-world "thing"

 **Analytics**
Rules, predictions, algorithms,

 **Control**
Twins can control the "thing" they represent

 **Monitor**
Query state, obtain notifications

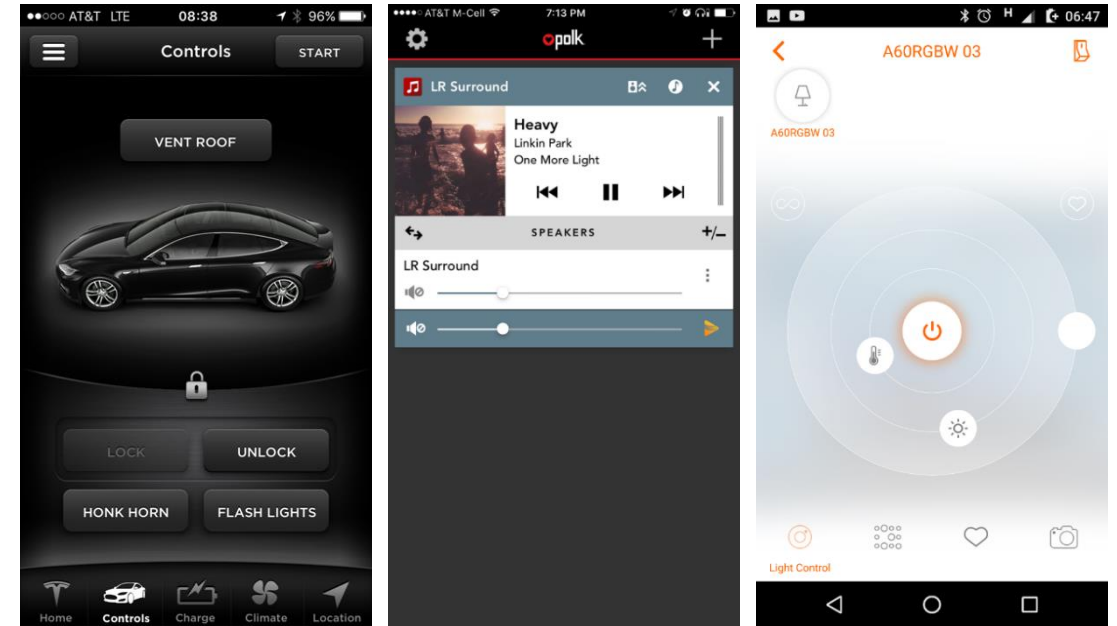


Facilities and Infrastructure as Digital Twins



Not All Digital Twins Need to be High Fidelity Physics Models

- Digital twins should provide you with a view into assets — based on your business objectives
- In the era of IoT, we should be able to have a detailed view of every device.
- If you do not have this view you will be commoditized.



By 2020, OEMs Must Have a Digital Twin Strategy or Risk Commoditization

Image sources: Courtesy of L. Shamanna, A. Velosa, A. Johnson

Digital Twins Drive Better Decisions



Emirates and GE Use Digital Twins to Optimize Maintenance and Identify Engines Requiring Extra Inspection

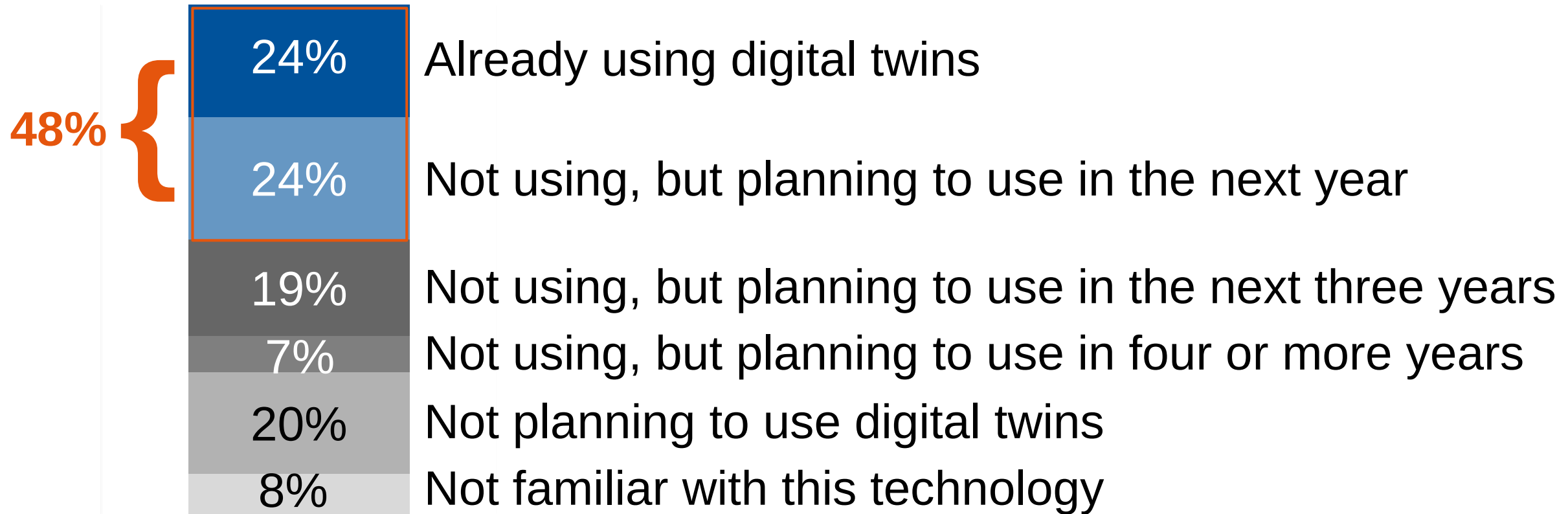
Image source: Gartner and GE Aviation (www.geaviation.com/digital)

Things and Processes Will Increasingly Involve Digital Twins



https://www.gerenewableenergy.com/content/dam/gepower-renewables/global/en_US/downloads/3d-still-images/wind-onshore-digital-wind-farm-representation-1900px.jpg

Majority of organizations are using or plan to use Digital Twins in the next year itself



Percentage of Respondents

Base: All respondents, excluding "don't know" responses, n = 200

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Source: Gartner, 2017

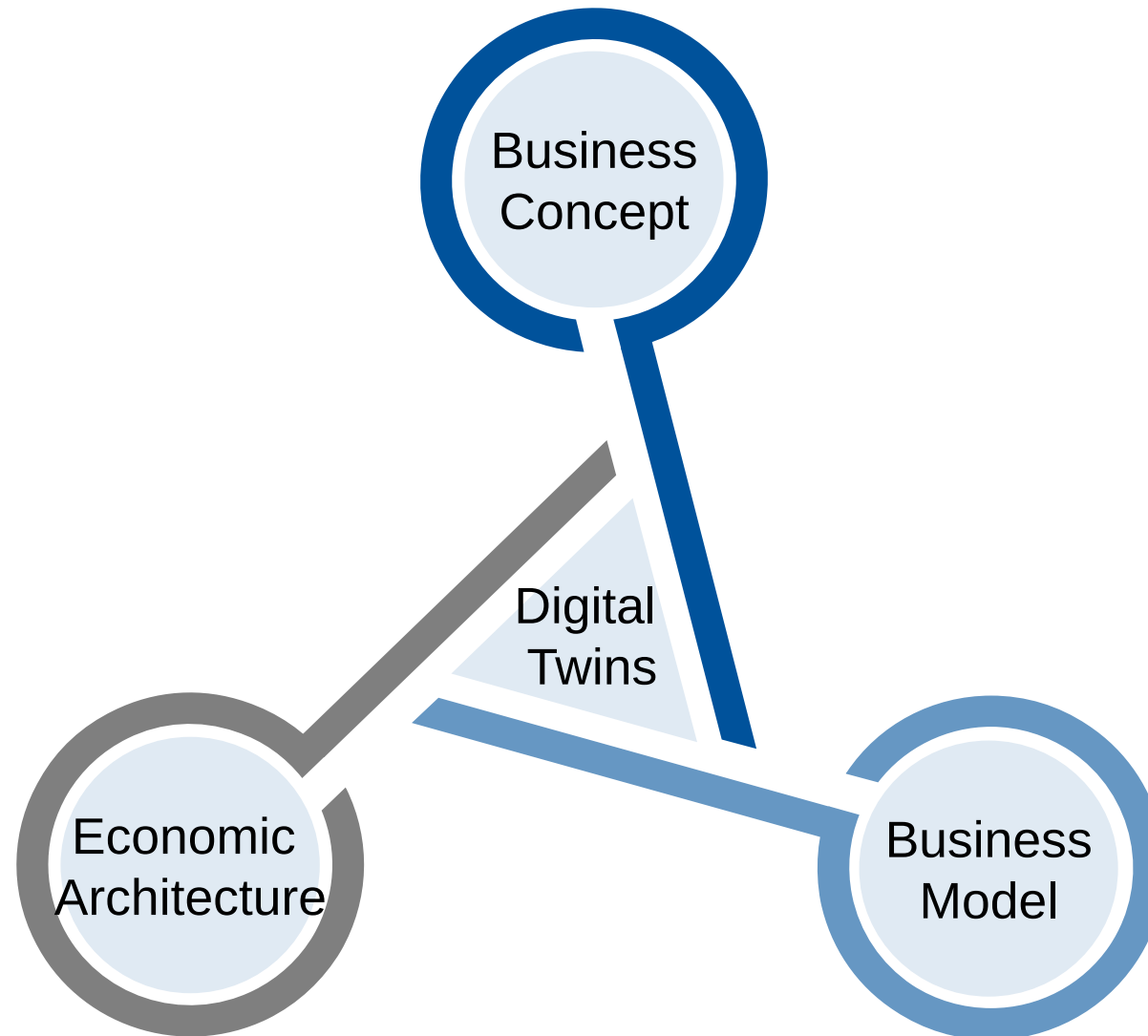
In your IoT solution implementation, is your organization also adopting digital twins?



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Priorities for Digital Twins Drive New Business Opportunities

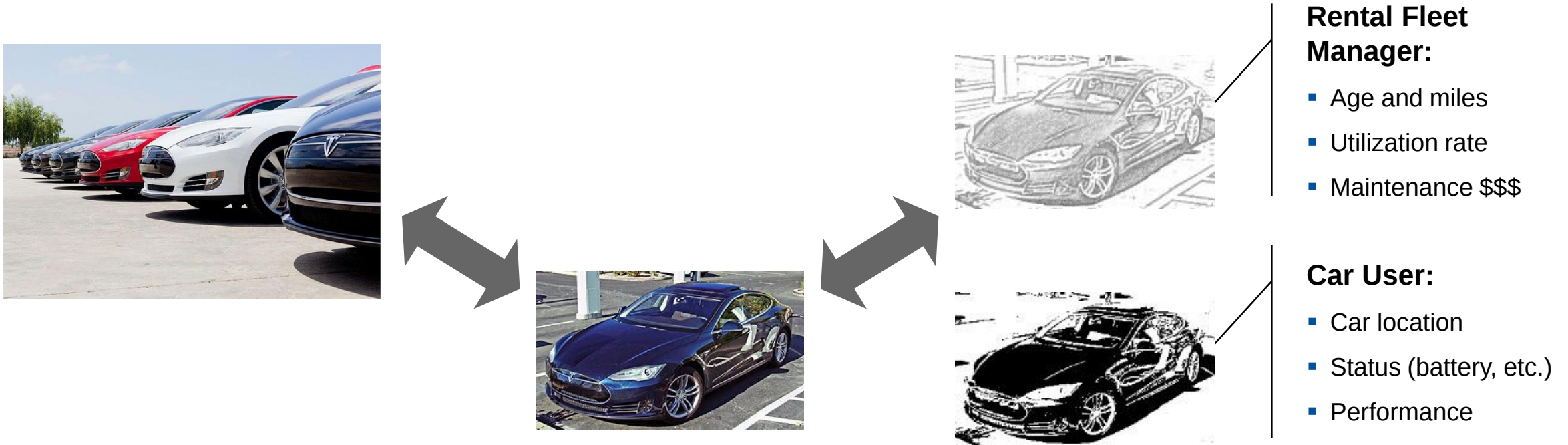


Digital Twin Value Depends on Your Core Perspective



Main Focus	External	Internal
Value	Product improvement Customer service New business models	Cost reductions Process improvements Safety
Challenges	Your product team will need to become a software + hardware team	Your operations team will have to integrate multiple tech companies

Digital Twin Asset Views: Business Objective Dependent

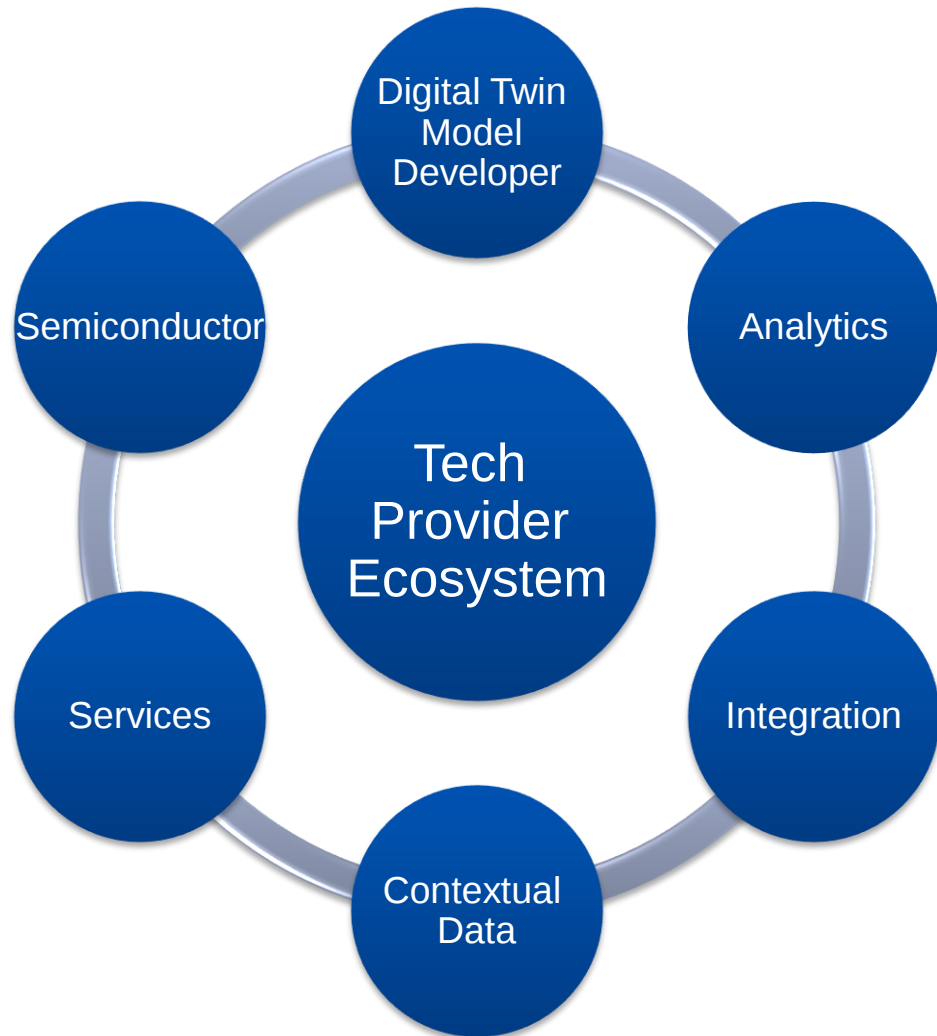


Understanding the relevant business decisions drives the design of digital twin personas.

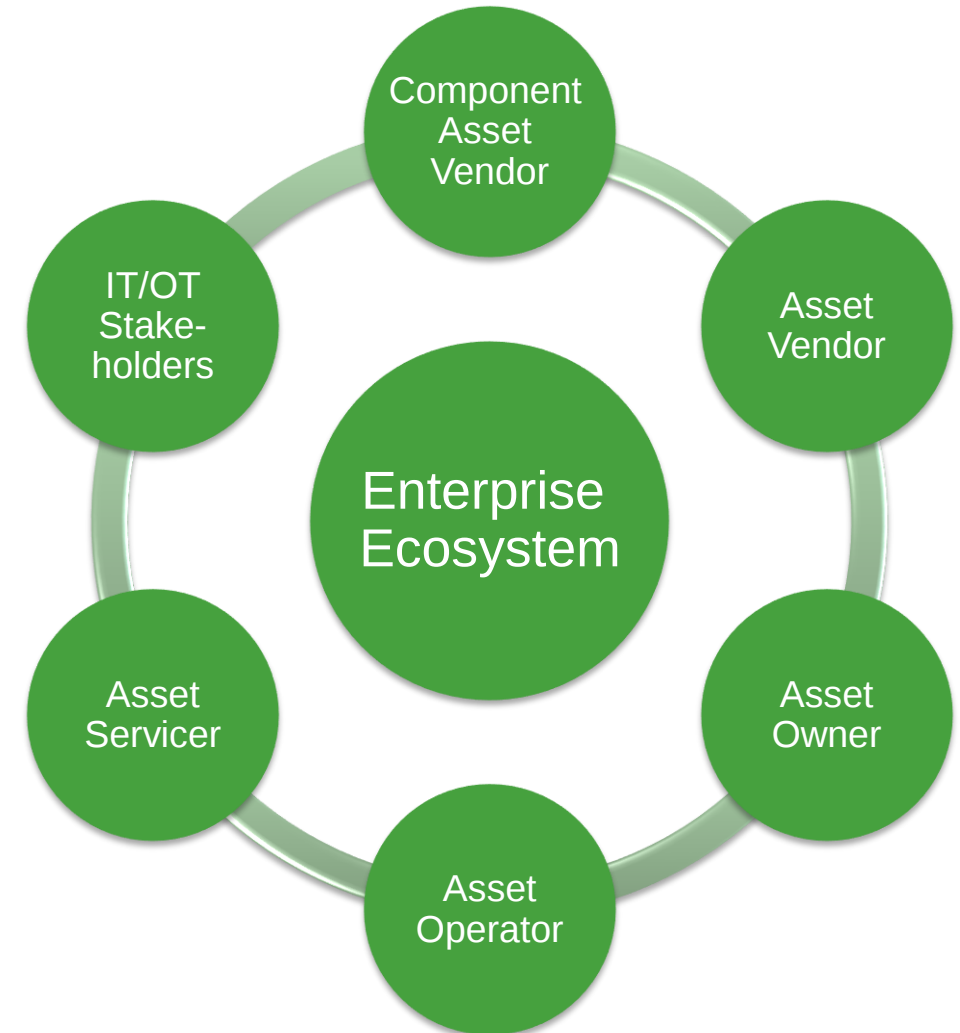
Image sources: Cars: [https://commons.wikimedia.org/wiki/File:Dude,_wheres_my_car%3F_\(323784683\).jpg](https://commons.wikimedia.org/wiki/File:Dude,_wheres_my_car%3F_(323784683).jpg) — under the Creative Commons Attribution-Share Alike 2.0 Generic license.

Tesla: https://upload.wikimedia.org/wikipedia/commons/thumb/9/9f/Tesla_Model_S_charging_Folsom_CA_trimmed.jpg/320px-Tesla_Model_S_charging_Folsom_CA_trimmed.jpg — licensed under the Creative Commons Attribution 3.0 Unported license.

You Will Need to Marry Quarreling Ecosystems to Maximize Your Digital Twin Value



Who Is
Responsible
for
Integration,
Security,
Overall
Functionality?
YOU



Digital Twin Cautions



Vendor "twin washing"



Vendor lock-in



Longevity of technology and models



Data ownership and confidentiality



Unclear value of data collected



Skills, IT, design, simulation, ...

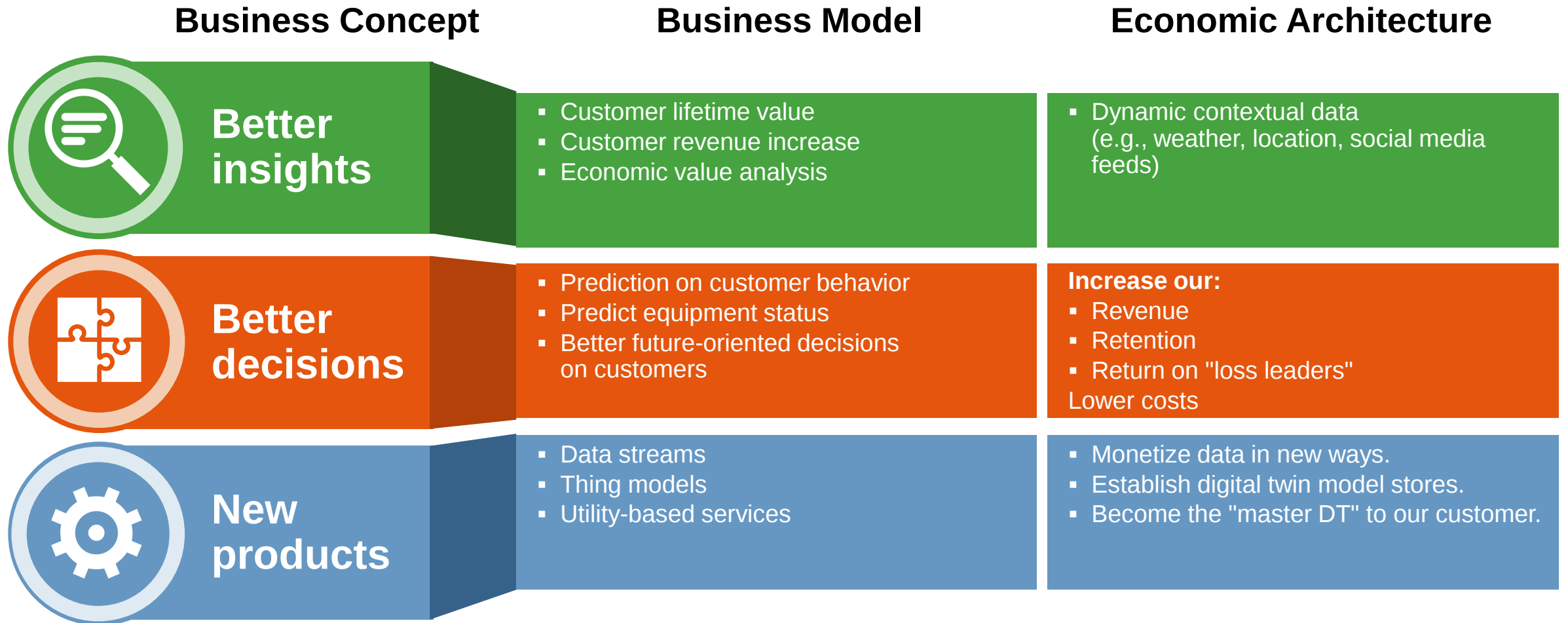


Data interchange/integration standards

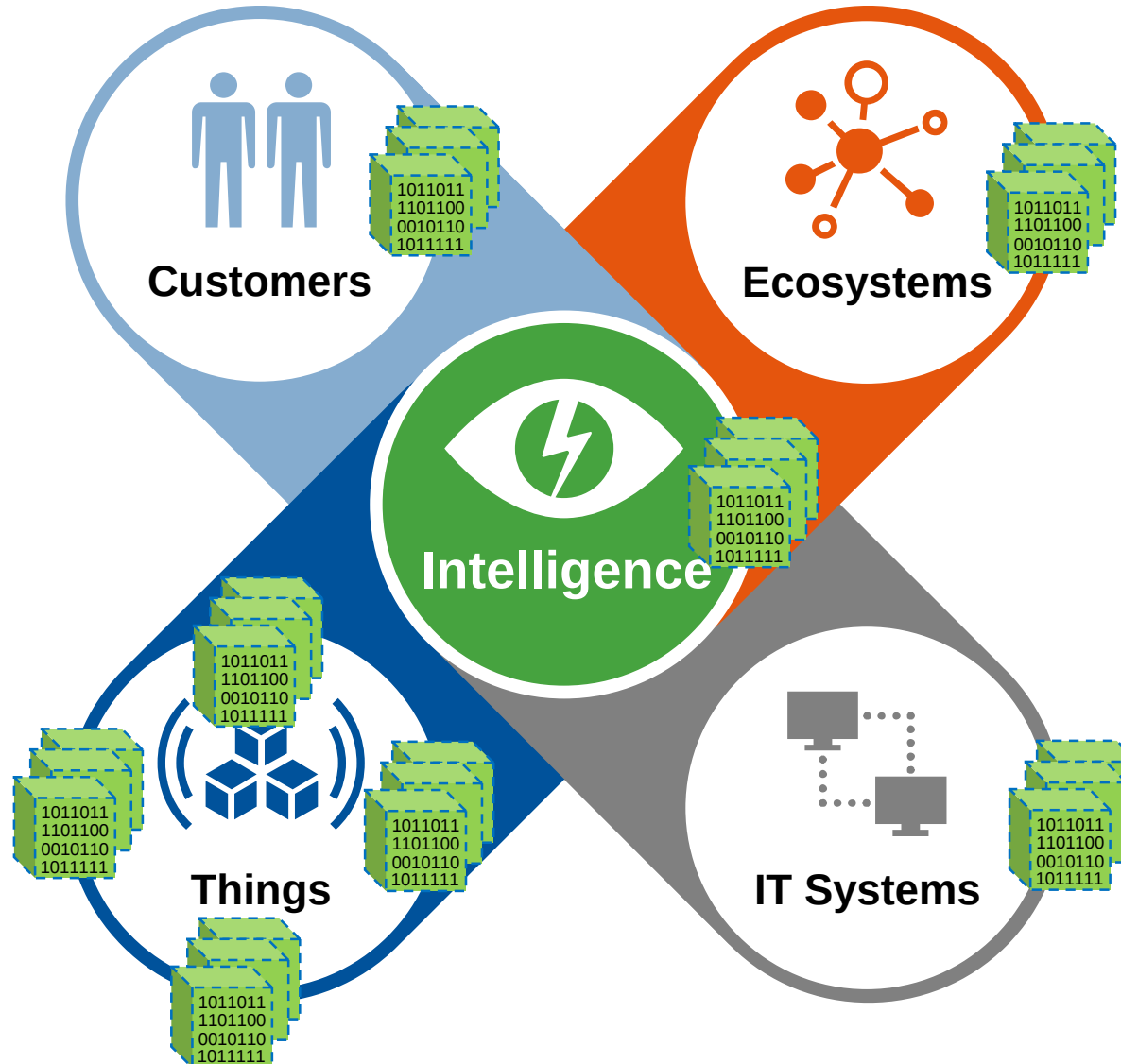
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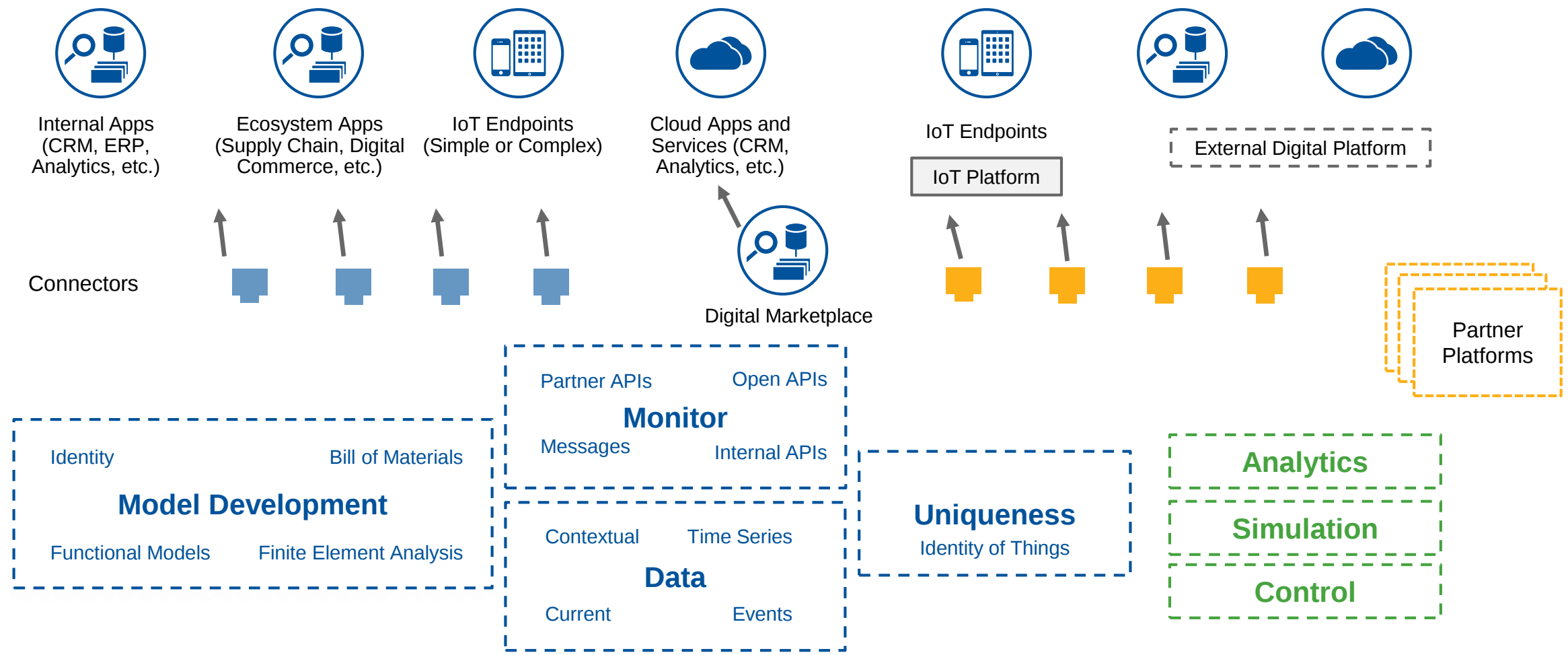
Determine the Digital-Twin-Enabled Business Models (Strategic Business Architecture)



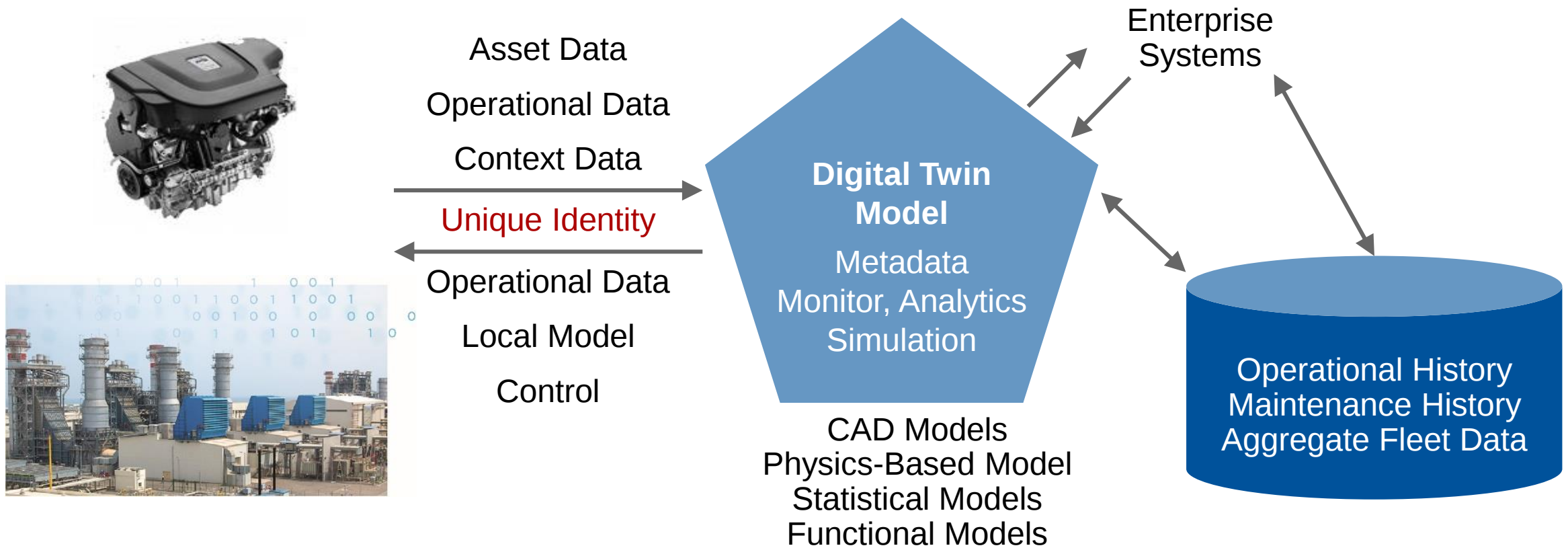
Scope the Digital Twin Technologies Needed (Conceptual Architecture)



Define the Digital Twin Integration Plan (Logical Architecture)

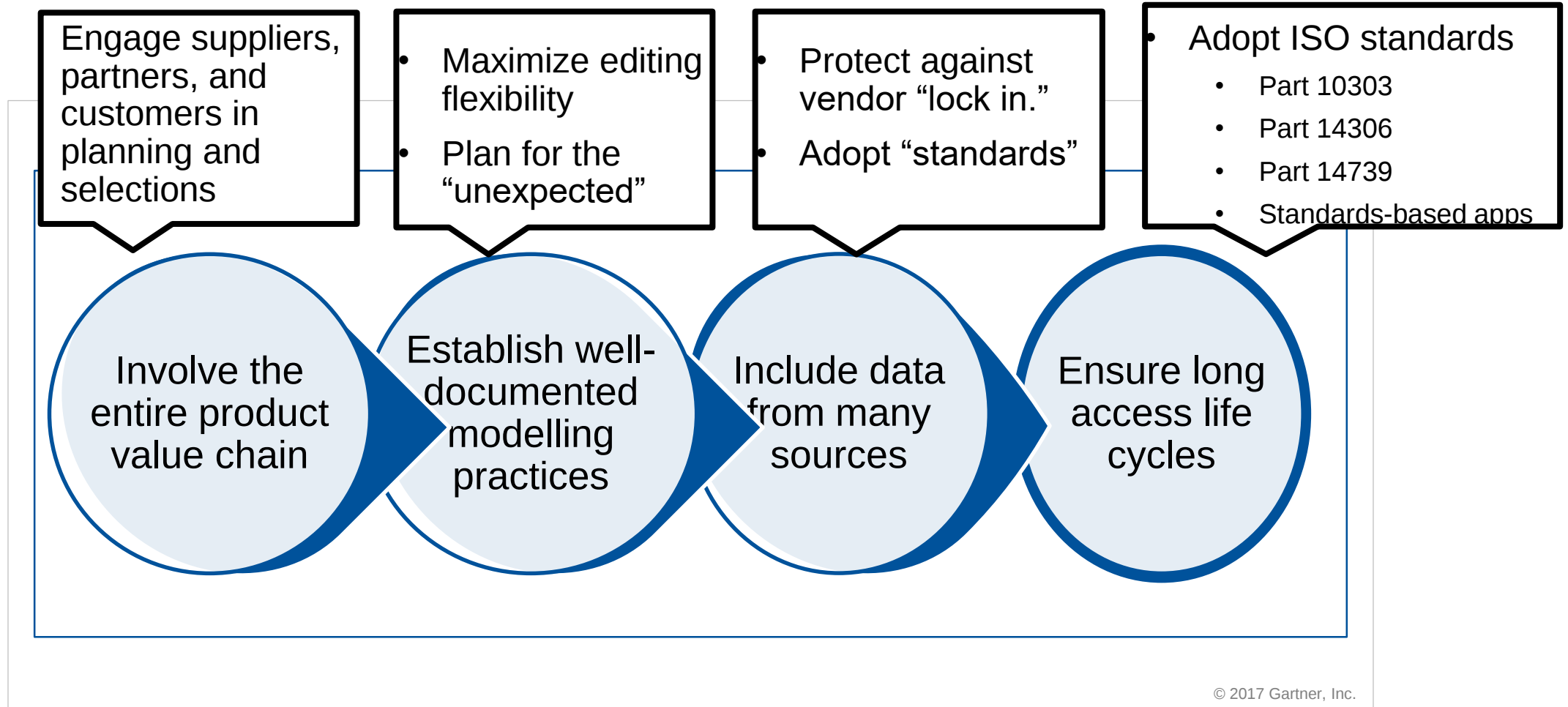


Evaluate IoT and Digital Twin Technologies, Services and Disciplines (Implementation Architecture)

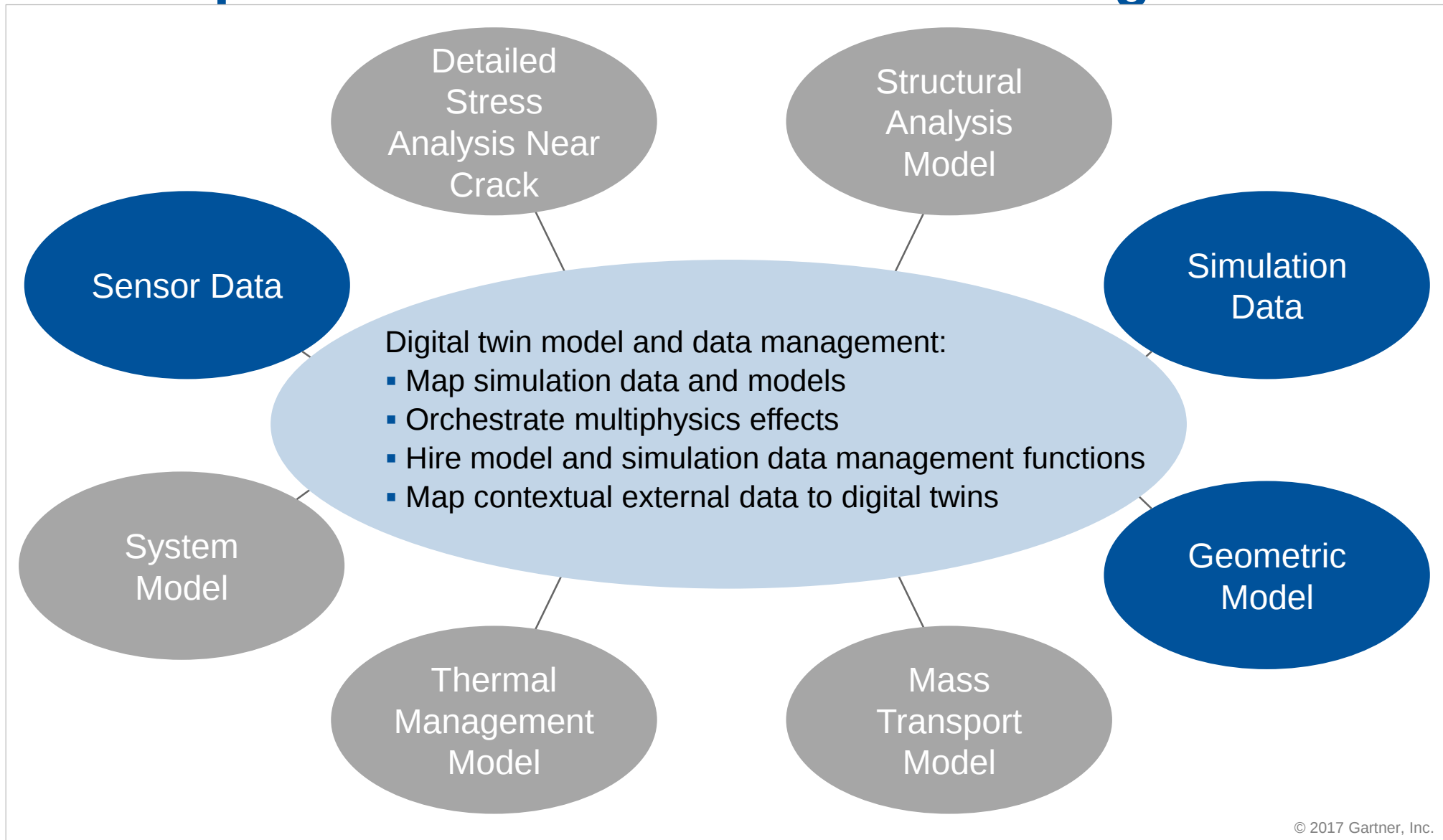


Keep Your Digital Twin as Simple as Possible, but No Simpler Than That.

Digital Twin – Best Modeling Practices



Enable Comprehensive Simulation Modeling and Management



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Recommended Gartner Research

- ▶ [Four Best Practices to Avoid Digital Twin Failures](#)
Marc Halpern, Andrew Stevens, Alexander Hoeppe (G00331611)
- ▶ [Innovation Insight for Digital Twins — Driving Better IoT-Fueled Decisions](#)
Alfonso Velosa, W. Roy Schulte and Others (G00324871)
- ▶ [Use the IoT Platform Reference Model to Plan Your IoT Business Solutions](#)
Benoit J. Lheureux, Yefim V. Natis and Alfonso Velosa (G00311536)
- ▶ [Hype Cycle for the Internet of Things, 2017](#)
Alfonso Velosa, W. Roy Schulte and Benoit J. Lheureux (G00314298)
- ▶ [Digital Twins Will Impact Economic and Business Models](#)
Alfonso Velosa and Dale Kutnick (G00328808)

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